DOCUMENT RESUME

ED 351 945 HE 026 007

TITLE Engineering Education for the Twenty-First Century: 1992-1993 Strategic Plan. The Process of Engineering and the Engineering Education Process. Version #4.

INSTITUTION Southeastern Univ. and Coll. Coalition for Engineering Education.

PUB DATE 15 Oct 92

NOTE 24p.

PUB TYPE Reports - Descriptive (141)

EDRS PRICE MF01/PC01 Plus Postage.

DESCRIPTORS *Curriculum Development; *Curriculum Enrichment; Educational Planning; *Engineering Education; Higher Education; Long Range Planning; Organizational Objectives; *Professional Development; *Professional Education; Technical Education; Undergraduate Study

ABSTRACT

This paper outlines the Southeastern University and College Coalition for Engineering Education's (SUCCEED) vision for designing and implementing a fundamentally new and experimental engineering curriculum with the engineering programs of its member institutions. The new curriculum, which emphasizes the process of engineering as well as the engineering education process, is viewed as important in promoting the nation's competitiveness in the emerging global economy and sustaining a national resource of high-quality engineering talent for the future. Three principles separating this curriculum from others in engineering include: (1) its provisions for continuous improvement; (2) a system for promoting career participation and success; and (3) a system for creating transparent boundaries and methods for integration between courses, departments, schools and colleges, and institutions within the academy. Provided is an explanation of the SUCCEED vision for the new curriculum, a discussion of the SUCCEED mission in developing the undergraduate engineering curriculum for the 21st century encompassing the concept of Total Quality Management, and an examination of SUCCEED program goals and objectives in curriculum development. Finally, the report provides the SUCCEED 1992 annual calendar of events, meeting agendas, and administrative milestones. (GLR)

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SUCCEED

The Southeastern University and College Coalition for Engineering Education

• Clemson University • Florida A & M University • Florida State University • Georgia Institute of Technology • North Carolina A & T State University • North Carolina State University • University of Florida • University of North Carolina at Charlotte • Virginia Polytechnic Institute and State University •

♦ An NSF Engineering Education Coalition ♦

1992-1993 STRATEGIC PLAN

ENGINEERING EDUCATION FOR THE TWENTY-FIRST CENTURY

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THE PROCESS OF ENGINEERING AND THE ENGINEERING EDUCATION PROCESS

HE 026 007

Version #4
15 October 1992

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1.0 Introduction

SUCCEED is a coalition of southeastern schools and colleges committed to the development of a new and innovative approach to the undergraduate engineering curriculum and the engineering education process. The participating institutions include Clemson University, Florida A & M University, Florida State University, Georgia Institute of Technology, North Carolina A & T State University, North Carolina State University, University of Florida, University of North Carolina at Charlotte, and Virginia Polytechnic Institute and State University.

SUCCEED's regional alliance of universities has a distinguished record of influence and leadership in engineering education in our nation. A major segment of U. S. engineering graduates receive baccalaureate degrees from SUCCEED programs. For example, in 1990, 1 of 15 B. S. degrees awarded nationally, 1 of 9 B. S. degrees awarded nationally to an African American, and 1 of 16 B. S. degrees awarded nationally to a woman resulted from students graduating from SUCCEED engineering programs. Today, 1 of every 13 engineering students in the nation is enrolled in one of the eight SUCCEED institutions. Thus, the five states represented by SUCCEED will continue as a predominant national pool for engineering students into the twenty-first century. These important southeastern demographics coupled with SUCCEED's approach to the development of a new engineering curriculum which focuses on the process of engineering and the engineering education process will provide important national leadership for sustaining U. S. competitiveness now and in the future.

2.0 SUCCEED Vision

SUCCEED's theme is "**engineering education for the twenty-first century**", conveying our vision - the designing and implementing of a fundamentally new and experimental engineering curriculum within the engineering programs of our institutions. The **key concept** for this new curriculum resides in our dual emphasis on the process of engineering and the engineering education process. These two processes are of fundamental importance in promoting our nation's competitiveness in the emerging global economy and sustaining a national resource of high-quality engineering talent for the future. Thus, three principles will distinguish SUCCEED's curriculum from other engineering curricula through its provisions for:

- a system for achieving **continuous improvement** in the engineering education process;
- a system for promoting **career participation and success** for all students and faculty in engineering, especially women and under-represented minorities in engineering; and
- a system for creating **transparent boundaries and methods for integration** between courses, departments, schools and colleges, and institutions within the academy.

Through its new curriculum model and its academic environment, SUCCEED will stimulate **cultural change** in engineering education. Students will become active learners and participants in their own education. This experience will serve as the catalyst for life-long learning. Faculty-student interactions will be stimulated with discovery-oriented learning processes which are enhanced by the use of new technology. Technology will also serve as a network for resource multiplication. Engineering practice will be integrated throughout the curriculum, cultivated by increased industry-university interactions and orchestrated by faculty who educate students to identify and define engineering problems, develop and evaluate alternative solutions, and implement designs within a practical framework. Teaching and research will be rewarded equally, and faculty members will achieve promotion and tenure through their excellence in teaching and educational research as well as their technical and scientific research activities.

Thus, in the twenty-first century, creativity in engineering education will become an integral part of the educational process through design, implementation, testing and continual evaluation of a new model and process for the engineering curriculum.

Another important dimension for **cultural change** will emerge through SUCCEED's emphasis on **the process of engineering and the engineering education process** as new student, faculty, and academic attributes are identified and integrated into the curriculum. This emphasis on process is important because a major dimension of future U. S. competitiveness will be realized from the efficiency of our industry's product realization/development processes. The failure of U. S. industry to commercialize technology rapidly and effectively is uniformly attributed to a lack of attention to improvements in process technology. This is the focus of almost all recent literature on competitiveness. Furthermore, the efficiency of the product development process dictates major structural changes in industry, and a very significant manifestation of these changes can be seen in the quality management movement (TQM). These rapid industrial changes, driven by competitiveness, will have a fundamental impact on engineering education and the development of the engineering curriculum for the twenty-first century.

Most engineering curricula have emphasized the term "product" in the product development process and, to a large extent, the processes used to realize products have been ignored in the education of today's engineers. Engineers, as products of the current education system, have certain attributes which are usually limited to a sampling of technical areas within their disciplinary curriculum. In the past, these attributes were both sufficient for and consistent with the product development process of industry. However, the product development process in industry was highly compartmentalized and the boundaries between stages of product development were often barriers to the effective utilization of new technologies and engineering advances. Today, the quality movement in industry is moving rapidly to eliminate these barriers through emphasizing the process as much as (or more than) the product, thereby requiring a longer and more diverse list of attributes from the new generation of engineers. These industry needs and student attributes must be carefully evaluated and implemented into the engineering curriculum for the twenty-first century.

Thus, through our emphasis on the process of engineering and the engineering education process, SUCCEED proposes a new curriculum which will demonstrate ways to educate a new generation of engineers who understand both the product aspects as well as the process aspects of the product realization/development process. We will implement a new curriculum model which promotes these concepts within the current engineering disciplines to produce disciplinary specialists. More significantly, the new curriculum model will also educate a new class of engineers, which can be identified as functional engineering specialists. This new type of engineer will function well within a product development team involving a wide range of individuals with a wide range of backgrounds and expertise which addresses all aspects of the process. The implementation of this new curriculum places a special importance on the development of educational technology, since resource sharing is required to implement this new curriculum model in a variety of institutions, such as those comprising SUCCEED. In addition, we propose that this new curriculum model and the development of the required educational technology will provide added benefits for student participation and success, especially among women and under-represented minorities. Also, we propose that this curriculum model will promote additional rewards and recognition for faculty members based on their scholarly contributions to the engineering education process. Thus, SUCCEED's key concept of process engineering and the engineering education process will define the technology systems required for the development of our curriculum model. It will also define the applications of our

curriculum model through the expected impact on student participation and success and the faculty reward and recognition system.

3.0 SUCCEED Mission

SUCCEED is both an effort to develop the undergraduate engineering curriculum of the twenty-first century and a commitment to create an academic environment focused on quality and continual improvement of engineering education. Furthermore, the major emphasis for our curriculum model is expressed through a focus on the process of engineering and the engineering education process. **Total Quality Management (TQM)** is an emerging structural system of fundamental principles and practical tools for monitoring and improving an identifiable process. In general, a TQM system provides mechanisms for creating organization-wide participation in planning and implementing continuous improvement that exceeds the expectations of the customer. Engineering educators must recognize that we do have many customers, the most important being our students. The essence of TQM is team study devoted to process improvement. This simple, but fundamental, idea has application in both program development and curriculum development. Thus, SUCCEED will implement the principles of TQM in all phases of the planning process to realize its distinctive vision and to cause continuous improvement in achieving its mission.

SUCCEED's mission comprises responsibilities for educational research, program development and project management to establish the content, framework, instruction/learning environment, and evaluation procedures for our new curriculum model, which we call **CURRICULUM 21.** The methods of integration originating from TQM will be used in every aspect of planning and implementing this mission. In general, TQM has three basic integrating components for the planning and operations processes -- breakthrough planning, daily management, and cross-functional management. The cumulative results of these three synergistic components will contribute to establishing the organizational culture for continuous improvement. The **breakthrough planning** process of TQM will set the strategy to get control of the synergy and use it to realize SUCCEED's vision. Breakthrough planning is a variation of the Hoshin planning process used in the Japanese version of TQM. It is system- and process-oriented, and it focuses on identifying the changes required within the organization based on the defined critical program objectives. These objectives for SUCCEED are based on the original proposal submitted to the NSF which have been refined and stated in the Cooperative Agreement (see Section 4.0 for further details). On this basis, the initial **strategic breakthrough items** which will cause fundamental improvements in quality and move SUCCEED towards its vision are:

i) **Alternate entry:** To develop effective model interfaces between CURRICULUM 21 and the principal supply sources of engineering students to all our institutions;

ii) **Student participation:** To insure retention, success and graduation of all students in CURRICULUM 21, especially for women and under-represented minority students;

iii) **Faculty recognition:** To achieve career participation and success of engineering faculty based on their educational research and teaching scholarship towards the development of CURRICULUM 21;

iv) **Total Quality Management:** To sustain a continuous, systemic improvement of CURRICULUM 21 and the engineering education process through implementation of the philosophy and principles of Total Quality Management.

The **outcome goal** of breakthrough planning is CURRICULUM 21. It must be applicable in the diverse engineering programs of all the SUCCEED institutions, and it must accommodate the mainstream academic disciplines within engineering education today. It must also comply with the changing needs and be adaptable to the future needs of engineering education. The model for CURRICULUM 21 must be of high-quality, and there must be sound, demonstrable pedagogical and economic reasons for adopting this model over existing and other proposed models. Students who study engineering in CURRICULUM 21 must have academic credentials which appeal to the commercial sector and allow them to compete successfully in the nation's graduate schools. Breakthrough planning sets the strategy for achieving the outcome goal by identifying process goals using the information obtained from the system (i.e., the breakthrough items shown in Figure 1). It also provides a structure for monitoring progress towards the vision through these process goals. Thus, the development of CURRICULUM 21 will be in parallel with the implementation of these **process goals** which will initially include the following items:

i) **Sensory System:** A quality measuring framework consisting of systemic assessment tools such as performance measures and benchmarks which will provide feedback to CURRICULUM 21.

ii) **Resource Center:** A computer system which will contain: (1) a coalition-wide data base with linkages to institutional research and the Sensory System; (2) a SUCCEED institutional network with external linkages to other engineering coalitions; and (3) an instructional environment for experimental teaching to facilitate inter-departmental and inter-institutional collaborations while developing CURRICULUM 21.

iii) **Functional Teams:** They will be made up of people who are educated on the principles and practices of TQM and who will integrate the methods of TQM into their projects and their component of CURRICULUM 21.

Figure 1 shows SUCCEED's mission in schematic form, with the institutional resources of our eight engineering programs, the breakthrough items, and the process goals all contributing to the outcome goal, which is CURRICULUM 21. Two other components of TQM, cross-functional management and daily management show horizontal and vertical integration in the organization. Daily management is a system that shows people what they must personally execute, measure, and control to achieve continuous improvement. Project teams will be asked to do their own breakthrough planning and to identify the components which will contribute to the outcome goals as well as the process goals. Cross-functional management will provide the necessary linkages, integrate the team activities between institutions, and incorporate the needs of the outside world into every phase of the operation. Pilot projects will be solicited and selected on a competitive basis to address the breakthrough items and the process goals. Cross-functional teams will set changes in strategy as necessary using accumulating information in the sensory system. Thus, Figure 1 illustrates the starting point for implementation of SUCCEED's strategic plan. As the breakthrough planning process matures, the breakthrough items and the process goals will be modified and communicated throughout the organization.

4.0 SUCCEED Program Goals and Objectives

Based on the Cooperative Agreement No. EID-9109853 between North Carolina State University and the National Science Foundation, the general goals of SUCCEED are defined as follows:

The Coalition's two primary goals are: (1) to substantially improve the quality and relevance of the engineering degree programs; and (2) to positively impact engineering education in the twenty-first century." To achieve these goals, SUCCEED shall implement educational research programs to produce the following objective results :

(1) Develop, implement and evaluate Curriculum 21 that focuses on integrating all subjects with engineering design and practice, eliminating course and infrastructure barriers to curriculum innovation, and understanding engineering as a process and a system.

(2) Implement Total Quality Management (TQM) principles and practices into the engineering curriculum, engineering education management and the engineering education process.

(3) Achieve a Coalition-wide increase in the total numbers of female and underrepresented minority students by 50% during the period of the award, an increase in student retention by at least 50%, an increase in the four-year graduation rates by a proportionate amount, and an increase in the number of students pursuing graduate degrees.

(4) Promote mathematics and science education in K-12, and an improvement in the interface with community colleges and 2-year and 4-year institutions.

(5) Implement a strategy for achieving parity between teaching and research in the engineering faculty reward system.

These two general goals and the anticipated results form the basis for the initial breakthrough planning process and the four breakthrough items shown in Figure 1. As the SUCCEED Strategic Plan is implemented and improved these four breakthrough items will be modified and expanded where appropriate and as required by the breakthrough planning process. The initial breakthrough planning process has also established the beginning objectives required to achieve the process goals and the outcome goal shown in Figure 1.

In what follows we list the objectives which define the pathway towards achieving these specified goals and results as stated in (1) - (5) above and as shown in Figure 1.

4.1 Outcome Goal (CURRICULUM 21)

We have established an initial model for the academic framework and education process for CURRICULUM 21, which is shown in Figure 2. CURRICULUM 21 must be applicable in the diverse engineering programs of all SUCCEED institutions, and it must accommodate the mainstream academic disciplines within engineering education today. Most importantly, CURRICULUM 21 must also provide a model to guide our emphasis on process engineering, it must be adaptable with changing needs of engineering education, and it must be amenable to monitoring, evaluation, and continual improvement. Thus, Figure 2 shows the model for CURRICULUM 21 placed in the framework of the student pipeline in order to define the important interfaces (K-12, graduate school, academic sector, etc.). In order to define the initial education process, we have separated the engineering curriculum into three important, inter-related learning stages for our students (i.e., Stage I, Stage II, and Stage III as shown in Figure 2). Part of the breakthrough planning process will be to refine these learning stages and to establish their relationships in terms of specific curriculum content which focuses on process engineering. Figure 3 shows the critical paths between the breakthrough items and the process goals leading to

CURRICULUM 21 and affecting the existing curriculum. This figure conveys two key concepts of our program: (1) we will improve the existing curriculum through experiments which define how process engineering can be integrated with product engineering in our existing curriculum; and (2) we will develop a new experimental curriculum which produces functional engineering specialists who serve as integrators in the product development process.

Goal 1. Develop, implement and evaluate CURRICULUM 21

Objectives to be achieved during the 1992 - 1993 funding year.

4.1.1 Fund four - six projects which address the implementation of Stage I Learning - The Integrated Engineering Core.

4.1.2 Fund four - six projects which address the implementation of Stage II Learning - The Engineering Design and Processes Core.

4.1.3 Fund three - four projects which address the implementation of State III Learning - The Functional Engineering Core.

4.1.4 Initiate a study which will lead to further identification and refinement of the critical components of the educational process that supports the implementation of the CURRICULUM 21 framework shown in Figure 2.

Objectives to be achieved during the 1993 - 1997 funding years.

4.1.5 Fund three - five projects which address the interface between Stage I Learning on the community college campus and Stage II Learning on at least two SUCCEED campuses.

4.1.6 Fund two - four projects which define Stage I Learning on a typical four-year liberal arts college campus which now supplies students to two or more SUCCEED institutions through a 2 + 2 engineering program.

4.1.7 Initiate efforts to apply the results obtained from the work of the joint faculty and industry team appointed to consider the methods for incorporating the appropriate academic components of TQM into CURRICULUM 21 framework and the three stages of learning (see Figure 2 and also see Section 4.4.2).

4.1.8 Use the results from the Sensory System (see Figure 1) to evaluate and refine the CURRICULUM 21 process and the three learning stages (see Figure 2).

4.1.9 Integrate the projects which address CURRICULUM 21 with the facilities under development within the Resource Center, incorporating delivery over the SUCCEED network to all campuses and incorporating the multi-media resources within both the curriculum experiments and the new experimental curriculum.

4.1.10 Make a thorough study of successful curriculum development/integration programs on other campuses nationwide, particularly in other NSF Engineering Education Coalitions, and examine them for adoption within SUCCEED.

4.2 Process Goals (Sensory System, Resource Center, Functional Teams)

The Process Goals establish the requirements for developing CURRICULUM 21. This is illustrated in Figure 4, which shows the SUCCEED operational plan complete with the curriculum model, horizontal and vertical components of management and the expected status at the end of the first year (on a relative basis as indicated by the partially-filled bars). Each process goal and the outcome goal will be evaluated through the TQM process, and the status will be up-dated as the objectives are evaluated, improvements are standardized, performance measures are established and as the process is refined within SUCCEED's evolving Strategic Plan.

Goal 2. Develop and implement the SUCCEED Sensory System

Objectives to be achieved during the 1992 - 1993 funding year.

4.2.1 Establish a coalition - wide data base which will define and track the enrollments of all students in SUCCEED engineering programs. Ensure that this data can be shared easily and effectively between all SUCCEED institutions.

4.2.2 Establish linkages with institutional research and administrative services on each campus to perform a longitudinal study of engineering curriculum performance and retention data with a large number of demographic, personality, and pre-engineering academic performance variables.

4.2.2.1 Communicate TQM principles and tools to institutional research

4.2.2.2 Initiate breakthrough planning process in accordance with TQM principles.

4.2.3 Establish a SUCCEED African American engineering student network whose purpose is to support the mentoring and retaining of this student group within SUCCEED institutions. Ensure that students are contacted and their progress monitored on a weekly basis. Develop student and faculty partner groups to promote participation in engineering.

4.2.4 Expand women and minority programs which are already underway on SUCCEED campuses to include all SUCCEED campuses (e.g., SECME).

4.2.5 Establish a partnership between the historically minority institutions within SUCCEED (NC A&T and FAMU/FSU) and the other six majority institutions to allow the minority students to participate broadly in academic programs of the majority institutions, while retaining their identity with the minority institutions.

4.2.6 Fund three - four new and novel projects which address mentoring and retaining women students within SUCCEED institutions.

4.2.7 Fund three - four new and novel projects which address mentoring and retaining of African American students within SUCCEED institutions.

Objectives to be achieved during the 1993 - 1997 funding years.

4.2.8 Establish a SUCCEED Women in Engineering support and information system using the SUCCEED communications network which promotes the participation of women students in engineering, provides for extensive interaction with women role models on

the SUCCEED faculty and industry, and which mentors all SUCCEED women engineering students on a regular and as-needed basis.

4.2.9 Develop a complete SUCCEED Program Evaluation Plan. This plan will be coordinated with the efforts of the other coalitions, and will use information generated by them that is applicable to SUCCEED.

4.2.10 Develop a TQM Plan for the components of the SUCCEED Sensory System.

4.2.11 Develop profile studies to compare academic performance, retention, problem-solving skills, and self-perception of students in CURRICULUM 21 with pilot groups in the traditional curriculum.

4.2.12 Standardize benchmarks and distribute them to coalition institutions to measure their relative improvement in the engineering education process.

4.2.13 Develop a set of attributes for the next generation of engineers using exit interviews and questionnaires, and collect data on relative importance of each attribute from students, faculty, and individuals from industry.

Goal 3. Develop and Implement the SUCCEED Resource Center

Objectives to be achieved during the 1992 - 1993 funding year.

4.3.1 Establish a SUCCEED resource bibliography which will contain titles and abstracts of relevant articles, reports, and book chapters on TQM, the engineering process, and the engineering education process.

4.3.2 Fund four - six projects which address the multi-media technology requirements for CURRICULUM 21.

4.3.3 Establish a SUCCEED telecommunications network pilot program which will allow information and resource sharing between all SUCCEED institutions.

4.3.4 Develop a multi-media resource center and the necessary institutional resources which will allow all institutions to integrate this technology into their SUCCEED experimental teaching and learning environments.

4.3.5 Make a thorough study of successful network, multi-media, and educational technology programs on other campuses nationwide, particularly in other NSF Engineering Education Coalitions, and examine them for adoption within SUCCEED.

4.3.6 Document and communicate the problem-solving process with TQM tools as shown in Figure 5 to all faculty members with SUCCEED-sponsored projects as the basis for a common language for process improvement.

Objectives to be achieved during the 1993-1997 funding years.

4.3.7 Expand the SUCCEED telecommunications network to include all institutions.

4.3.8 Define the facilities and management structure required to establish a coalition-wide engineering clinic involving the SUCCEED universities and industry.

4.3.9 Establish a multi-media development laboratory and a classroom for multi-media delivery on each campus which has access to the network and a delivery system for using the components of CURRICULUM 21.

4.3.10 Develop a model communications system between selected community colleges and at least three of the SUCCEED institutions which can be used to define the parameters required for incorporating Stage I Learning on the community college campus.

4.3.11 Fund three - five projects which address the interface between Stage I Learning on the community college campus and Stage II Learning on at least two SUCCEED campuses.

4.3.12 Fund two - four projects which define Stage I Learning on a typical four-year liberal arts college campus which now supplies students to two or more SUCCEED institutions through a 2 + 2 engineering program.

Goal 4. Establish SUCCEED Functional Teams

Objectives to be achieved during the 1992 - 1993 funding year.

4.4.1 Appoint a team of industry participants to advise and assist the SUCCEED management team in identifying how the application of Total Quality Management philosophy and principles can be applied within an educational institution.

4.4.2 Establish a joint faculty and industry team to consider the methods for incorporating the appropriate academic components of TQM into the CURRICULUM 21 framework and the three stages of learning (see Figure 2). NOTE: This is a joint objective which is shared with Goal 1 (see 4.1.5)

4.4.3 Develop a series of training sessions, including group visits to other facilities, for the SUCCEED management team to examine TQM programs at other universities and to consider and learn from these experiences how best to initiate the SUCCEED TQM strategy.

4.4.4 Develop a SUCCEED workshop on TQM to begin education of faculty members with SUCCEED-sponsored projects on the methods of TQM and how they can be integrated into their projects and their component of the curriculum.

4.4.5 Fund three - five projects which address methods for incorporating the principles and practices of TQM into CURRICULUM 21.

Objectives to be achieved during the 1993 - 1997 funding years.

4.4.6 Continue and expand the TQM educational programs for faculty, students and staff.

4.4.7 Expand the number of cross-functional teams within the institutions to develop cross-disciplinary, cross-institutional programs.

4.4.8 Appoint a SUCCEED faculty committee which will be charged with developing the strategy for achieving parity between teaching and research in the engineering faculty reward system. Among other areas, this committee will address:

i) measurable criteria for promotion and tenure in teaching and research.
ii) procedures for continual monitoring and improvement in the career pathways of un-tenured faculty members.
iii) procedures for recruiting faculty members which incorporate better measurement of criteria for anticipated success of candidates.
iv) techniques for promoting teaching and research experiences among young Ph.D students which provide for more optimal career choices.
v) development of media for displaying progress in teaching and educational scholarship.

4.4.9 Implement methods for integrating the information generated in 4.4.7 into the Sensory System.

5.0 SUCCEED Annual Calendar

The following calendar is applicable for dates after Sept. 1, 1992. The time between March 15 and August 31,1992 was the start-up period. The actions taken during this start-up period did not conform to this calendar.

Jan 15:	Program Committee Semi-Annual Review
Jan 20:	Annual Report (written)Due at NSF
Mar 1:	Beginning of SUCCEED Fiscal Year--Proposals Due
Apr 15:	SUCCEED Semi-Annual Meeting
Apr 16:	Program Committee Meeting
May 15:	Project Funding (subcontracts) to Universities
June 15:	Project Reports Due (Investigators-> Center Directors)
July 15:	Program committee Semi-Annual Review
Oct 15:	SUCCEED Semi-Annual Meeting
Nov 7:	NSF Coalition Meeting and Review
Dec 15:	Project Reports Due

6.0 Meeting Agendas

6.1 Program Committee Semi-Annual Review (Jan 15, Jul 15)

-Why: To review status of projects and plan future directions; Center Directors report to Program Committee on status of Center projects; SUCCEED Director reports on coalition projects (e.g., SUCCEED Network)
-What: Half-day (am) meeting of Program Committee, chaired by SUCCEED Director, followed by half-day (pm) meeting of Director with Deans' Council. Chair of Exec Committee might attend an session.
-Who: Program Committee, Deans' Council
-Where: At mutually convenient place, probably Raleigh, Charlotte, or Atlanta; later, might use network for all or some meetings
-When: Jan 15 and Jul 15, each year

6.2 SUCCEED Semi-Annual Meeting

-Why: Review status and progress toward objectives and goals; revise strategic plan and operational policies; secure input from Board of Visitors and other participants; also, Oct 15 meeting will be preparatory for Nov presentation to NSF and other coalitions.

-What: Evening social, followed next day by:

1. Plenary opening session, presentation by Director (overview of goals, objectives, accomplishments); report from "benchmark" group
2. Tours and /or special presentations by selected investigators
3. Breakout Sessions
   - -Board of Visitors--can call "witnesses", will critique progress report suggest new/revised plans/objectives/strategies, as appropriate
   - -Program Committee--more detailed review of projects
   - -Deans' Council and Director--more detailed review of goals progress, etc.
   - Representatives from Other Coalitions--will suggest ways to enhance interaction, resource sharing, etc...
   - -NSF and ABET Representatives can circulate
4. Closing Plenary--Reports from various breakout sessions; comments by Deans, Chair of Board of Visitors, other attendees
5. (Next day) Meeting of Program Committee to finalize proposal funding decisions for coming year
6. Need to think about ways to include "special" groups of supporters--e.g., industrial supporters not represented on Board of Visitors

-Who: Program Committee, Deans' Council, Board of Visitors, NSF Representative(s), Other Coalition Representatives, ABET Representatives, selected faculty & investigators.

-Where: Rotate among eight campuses

-When: Apr 15 and Oct 15, each year

7.0. Administrative Milestones for 1992

Following are 25 milestones associated with the administration of SUCCEED. Each milestone is listed under the date when it will be reached. The purpose of the activities leading to these milestones is to establish and continually improve the administrative structure and operational policies and procedures of SUCCEED, consistent with the goals of SUCCEED and principles and techniques of TQM

Milestones for 1992-93

By Jul 15, 1992:

- Administrative and planning subcontracts in place on each campus--approximately 10% of first-year funds
- Two to four projects funded and underway on each campus -- commit approximately 20-30% of first-year funds
- SUCCEED calendar finalized (meeting schedules, formats)
- "Benchmark team" appointed and funded

- "Network team" appointed and funded
- Preliminary proposal for uniform indirect cost completed and distributed to Council of Deans

By Aug 15, 1992:

- Board of Visitors appointed and notified of meeting schedule
- Assistant Director appointed and functioning
- Preliminary plan for SUCCEED network completed
- Uniform indirect cost policy approved and in place
- Five-Year Strategic Plan for each center and for SUCCEED administration drafted
- SUCCEED project and administrative database plan complete

By Sep 15, 1992:

- Measures and benchmarks defined
- Evaluation database established
- Evaluation Team functioning
- SUCCEED project and administrative database initialized and functioning

By Oct 15, 1992:

- Center and Administrative Strategic plans adopted
- Dry run of November presentation to NSF, other coalitions completed
- Final plan for SUCCEED network completed

By Nov 15, 1992:

- Complete presentation to NSF, other coalitions

By Dec 15, 1992:

- Draft first Annual Report, using project and team reports

By Dec 31, 1992

- Annual Report approved (with revisions) by Program Committee and Deans

By Jan 15, 1993:

- Proposal solicitation (RFP) for 1993 completed and distributed
- SUCCEED network in place and operating
- Annual Report sent to NSF, Board of Visitors, etc.

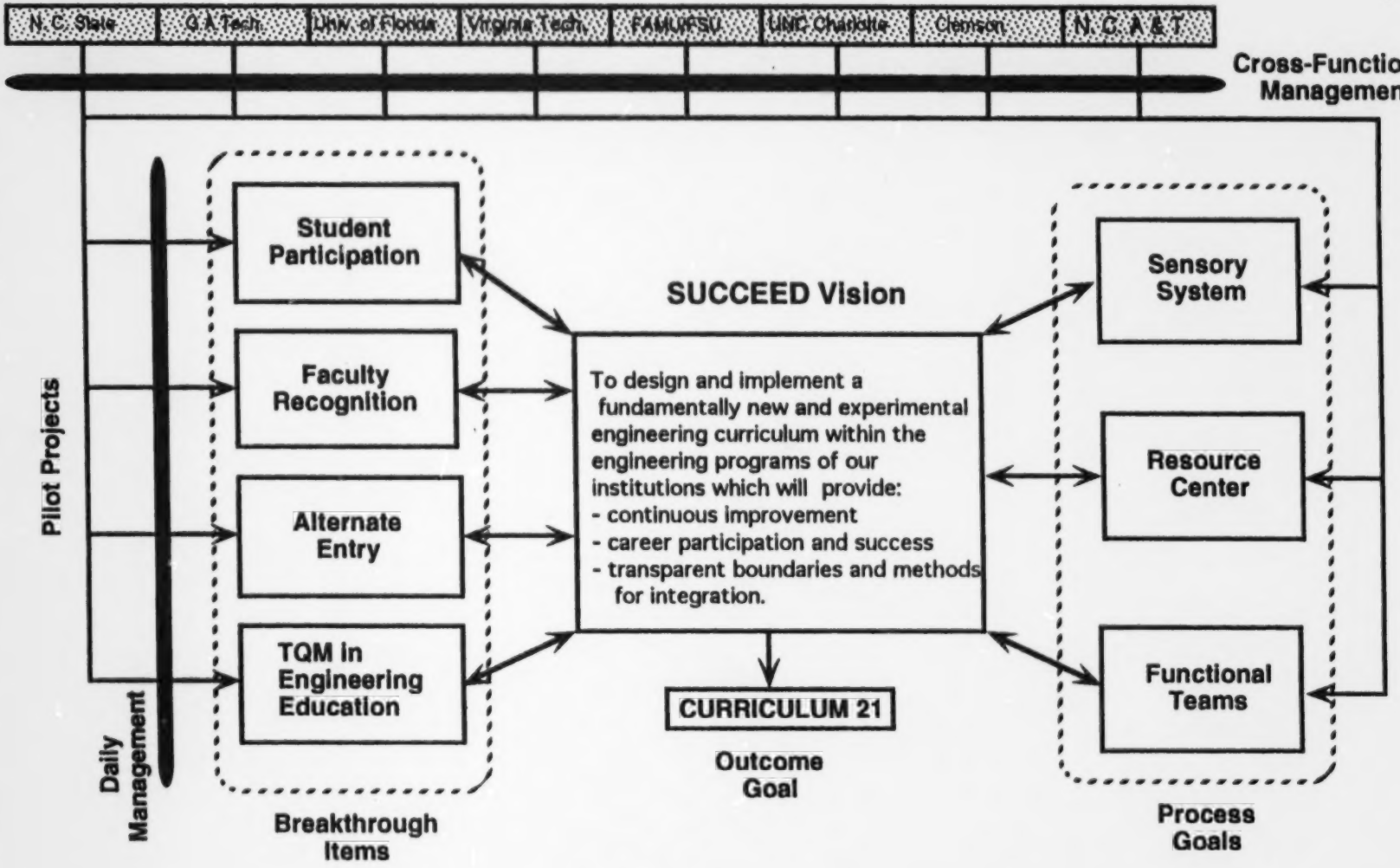

Figure 1. Schematic Diagram of the SUCCEED Mission Including Elements of the Strategic Plan.

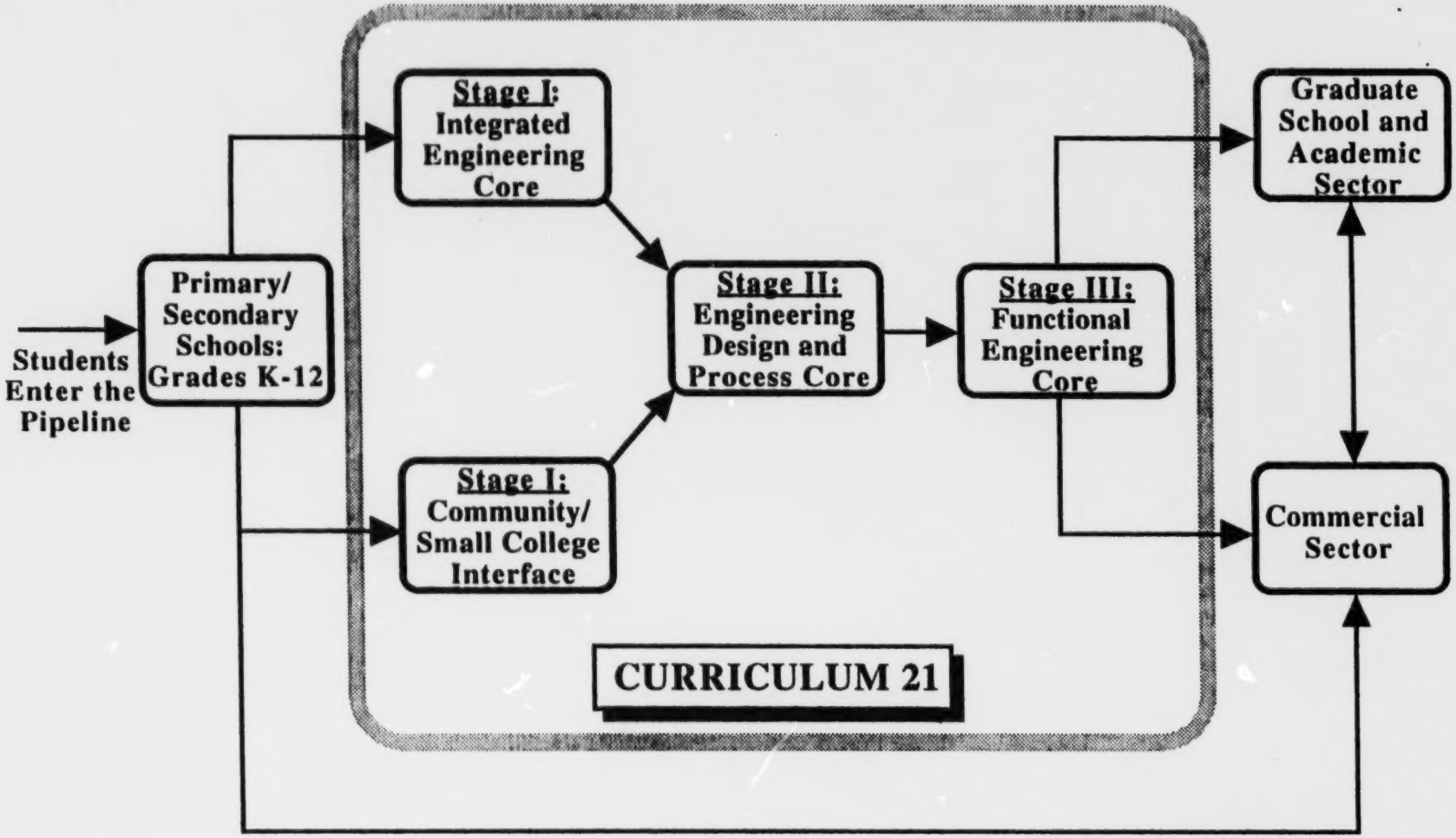
Students Enter the Pipeline
Primary/ Secondary Schools: Grades K-12
Stage I: Integrated Engineering Core
Stage I: Community/ Small College Interface
Stage II: Engineering Design and Process Core
Stage III: Functional Engineering Core
Graduate School and Academic Sector
Commercial Sector
CURRICULUM 21

Figure 2. The Critical Components of the Student Pipeline to be Addressed by SUCCEED. Here, the Student Pipeline is Placed in Perspective Within the Three Stages (Stage I, Stage II, and Stage III) of SUCCEED's Curriculum Restructuring Plan Which is Denoted as CURRICULUM 21 Contained Within the Indicated Boundary.

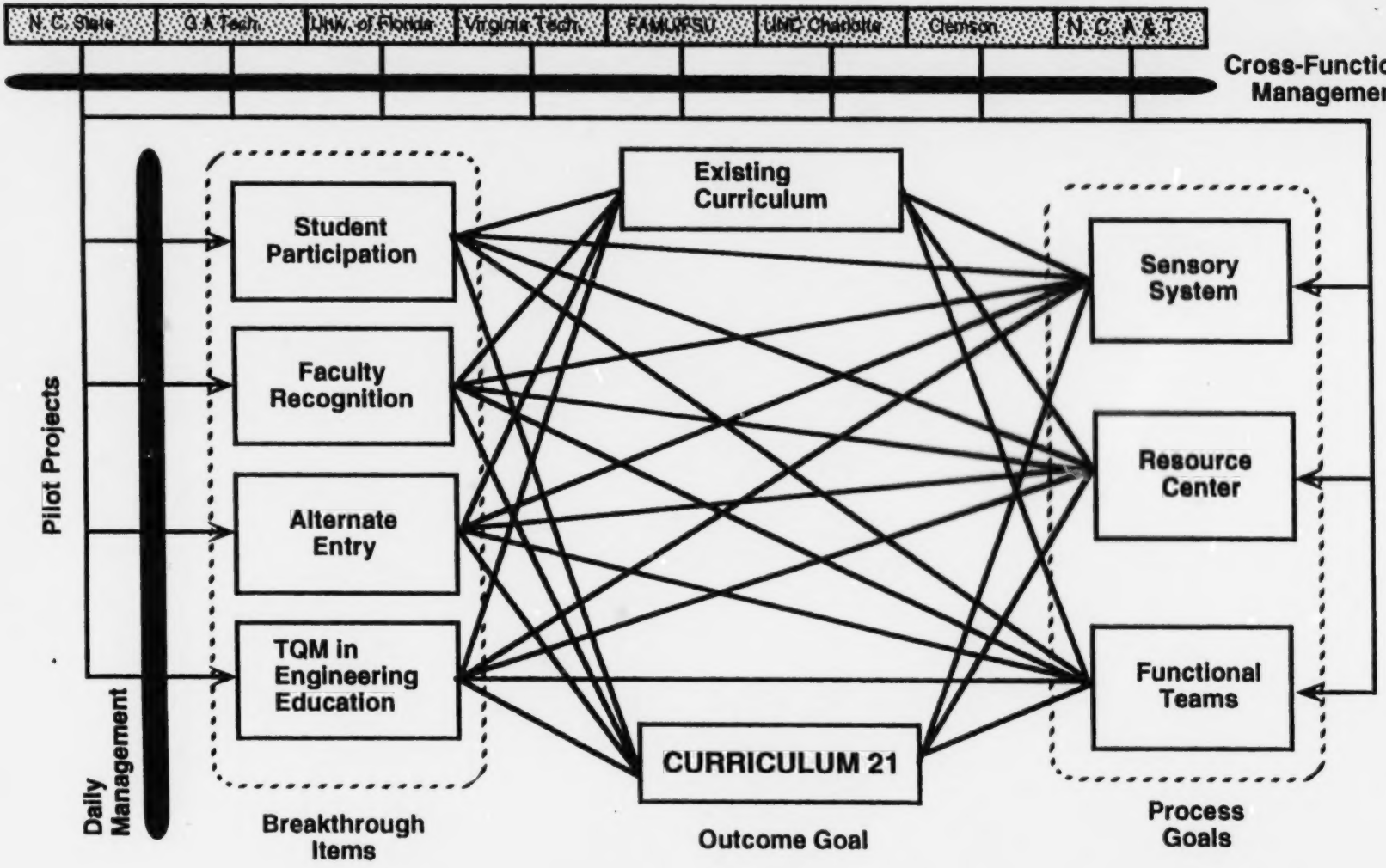

Figure 3. Critical Paths Showing Impact of SUCCEED's Strategic Plan on Existing Curriculum and the Development of a New Curriculum - CURRICULUM 21.

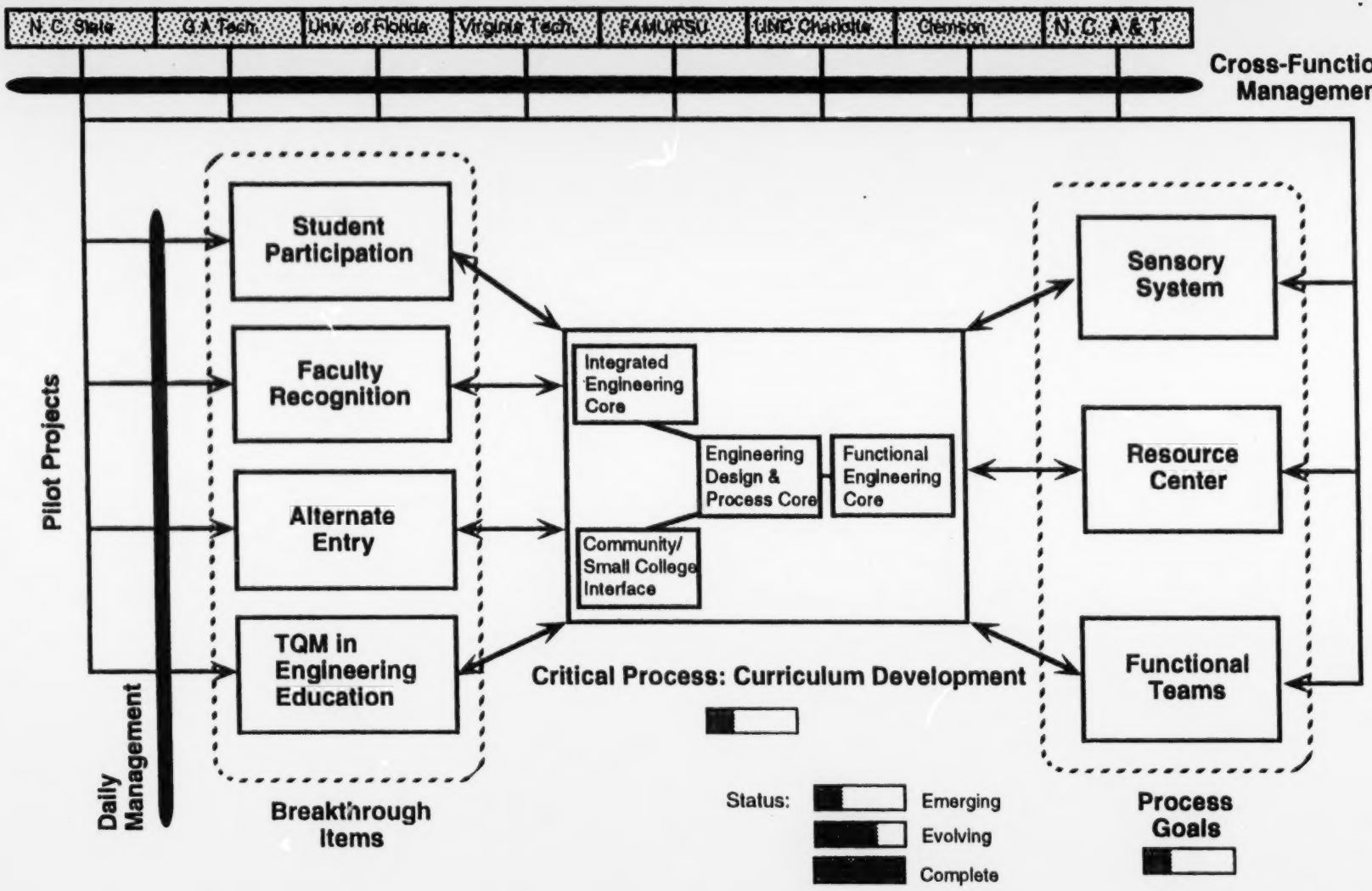

Figure 4. SUCCEED Operational Plan Illustrating the Development in Time (Over a Five Year Period) for the Critical Process (CURRICULUM 21) and the Process Goals.

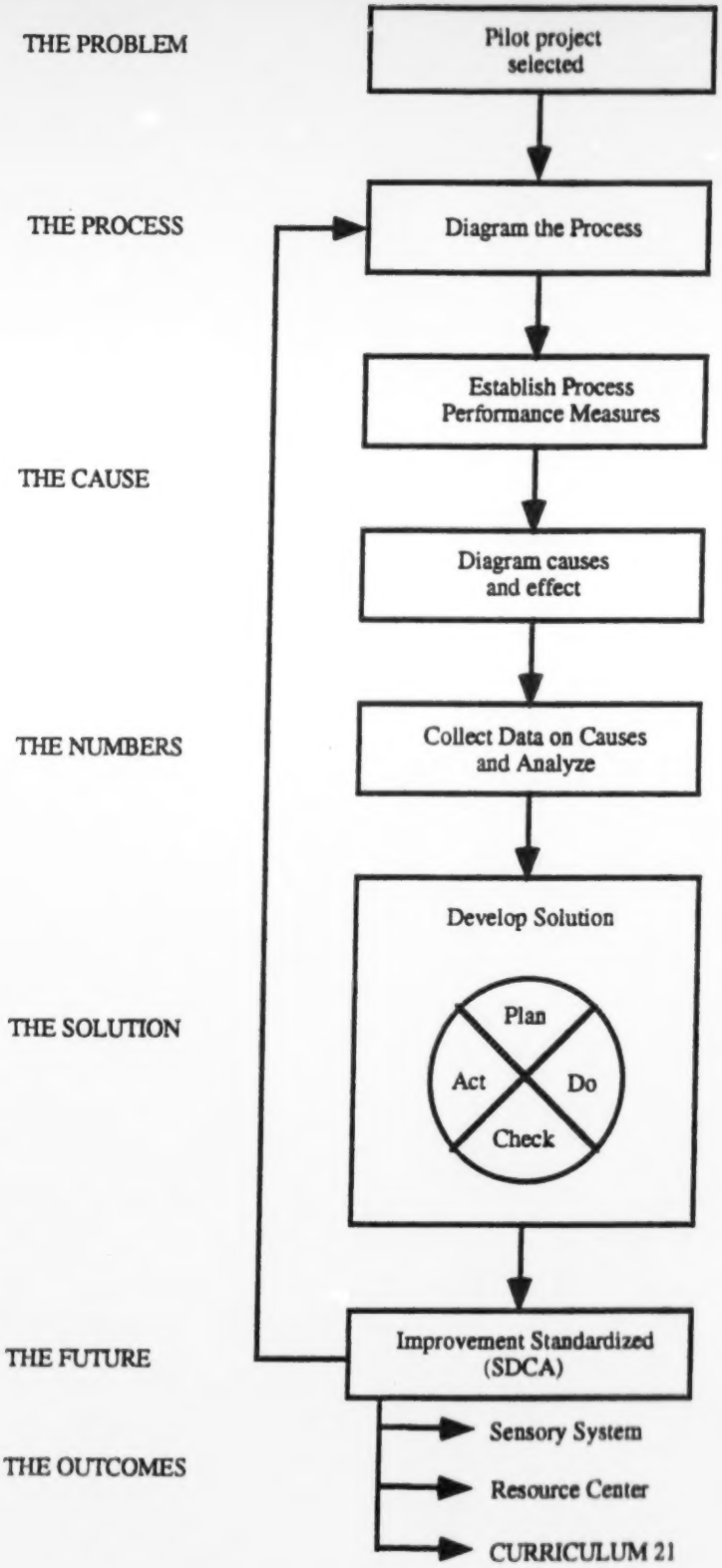

Figure 5. TQM Problem - Solving Process For SUCCEED Projects